DOCUMENT RESUME

ED 189 087 SP 016 332

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TITLE Videotaping in a Naturalistic Classroom Setting. Technical Report 5080.
INSTITUTION Texas Univ., Austin. Research and Development Center for Teacher Education.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE 80
NOTE 21p.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Classroom Observation Techniques; *Classroom Research; Reading Research; *Research Methodology; Video Equipment; *Videotape Recordings

ABSTRACT

Methods for videotaping a second grade classroom effectively and unobtrusively are described. Guidelines for equipment and personnel needs, equipment placement, and recording procedures are included. Details of the difficulties such methods present are also described. (SAS)

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ED189087

Videotaping in a Naturalistic Classroom Setting

C.H. Gardner, J.D. Miller & R.O. Clements

Research and Development Center
for Teacher Education

The University of Texas at Austin

Technical Report 5080

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SP016332

This study was supported in part by Contracts and Grants for the National Institute of Education to The Research and Development Center for Teacher Education, The University of Texas at Austin. The opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education and no official endorsement by that office should be inferred.

Videotaping in a Naturalistic Classroom Setting

C.H. Gardner, J.D. Miller & R.O. Clements

During the school year 1978-79, the Evaluation of Teaching Program at the Research and Development Center for Teacher Education at The University of Texas conducted a field study of nine second grade reading classes, using three observation methods: videotaping, ethnography, and a preconceived coding system. The study had three major goals: to build a videotape library as a resource for future research; to compare the three methods for gathering classroom data used in the field study; and to collect information for a substantive study of instructional techniques in the teaching of reading. The purpose of this report is to describe the procedural, technical, and theoretical aspects of videotaping in a naturalistic setting with an economy of crew and equipment.

Most of the videotaping techniques we developed evolved from the requirements of the classroom itself as a natural setting, and from the necessity, for the purposes of our study, of unobtrusiveness within that setting. A further constraint was imposed by the fact that the reading classes were subdivided into ability groups and our unit of study was reading group/teacher interaction. Our mission was to capture as much detail as possible within the reading group as it was being conducted by the teacher, while at the same time, ideally, conveying a sense of the activities of the rest of the class. The final limitations were our own small staff membership, and a finite amount of available equipment. This framework meant we must have at least two cameras, but as little else as possible. Primarily, however, to meet the most important criterion of research in the natural setting, care had to be taken to ensure that the videotape crew

and equipment did not interfere in classroom activities. How this was achieved, using the minimum of two cameras necessary to permit simultaneous observation of teacher and students, is described below.

Preliminaries

Meeting with the Teachers

After entry into the schools was obtained (a procedure already described in excellent detail by other researchers, notably Rist, 1975) it was necessary to meet with a number of second grade teachers to describe the study to them and secure their cooperation. At our request, the principals who had already agreed to the study set up these meetings, for which several staff members traveled to the schools at a time convenient for the teachers. The principals' participation in these meetings ranged from that of enthusiastic proponent of the study to ostensibly neutral observer. All of the teachers acquiesced readily to having observers in their classrooms, but many of them expressed considerable initial reluctance to being videotaped. They advanced a variety of reasons: too reminiscent of videotape evaluations from undergraduate days; camera shyness; unsureness about the use to which the tapes would be put--who would see them, in other words. These doubts were overcome by our assurances that the tapes were for research purposes only and would be seen by no one but R&D staff members and consultants. Even the teachers themselves would never have to see them unless they wanted to. (They all eventually wanted to.) We promised to set up and adhere to a mutually convenient videotaping schedule, for example, not to tape on what the teachers called "bad days"--Mondays and Fridays in most cases--and to notify the teachers considerably in advance of schedule changes. Nine of the 14 teachers we talked to agreed to participate in all aspects of the study, and co-signed with the principal investigator an agreement/permission form (Appendix A).

Permissions

It was also necessary to obtain the permission of the parents for their children to participate in the study. The teachers were asked to distribute permission forms (Appendix B) and to cooperate in seeing that they were returned. (A Spanish-language version of the form was also supplied for children with Spanish surnames.) About 1% of the parents refused videotape permission, which meant that something must be done to keep their children off-camera. This was accomplished in several cases by having the children attend other reading classes, which, fortunately, the flexibility of the team approach in our schools permitted. Where the student had to stay in the room when videotaping was being conducted, he or she was moved to a corner out of camera range and did not participate in reading group activities that day. This was an unfortunate effect of our presence in the classroom, but it only happened to two or three children out of 130 twice a month, and was necessitated by the legal and ethical requirements of our field research.

Maintaining the Schedule

The daily life of second graders at school is a complex, tightly orchestrated, often-disrupted round of activities. Fitting together their schedule of reading classes with the availability of R&D staff, equipment, and a cranky video van was a considerable logistical problem. It was crucial that communication channels between our staff and the teachers be kept open and active, so that unanticipated changes in any of these factors would not produce misspent effort or unexpected intrusion in the classroom. For example, the teachers in this study were very cooperative in letting us know when unanticipated changes occurred in the school schedule. This happened when a scheduled field trip was moved to another day due to bad weather, when standardized achievement tests were late arriving, thus moving the scheduled testing ahead by a week, and when staff development days or other special

events were scheduled. For our part, the videocrew notified the school immediately when unforeseen problems prevented their going to the field. Our philosophy was that courtesy even to the point of excess was better than misunderstandings about scheduling which might damage our relationship with the schools and the teachers. This kind of cooperation was invaluable to a project dependent upon so many variables, and should be carefully cultivated and maintained when the success of videotaping depends largely on the feeling of comfort and ease the teacher has with the videotape crew in her room.

Equipment and Crew

The basic equipment used consisted of two Panasonic WV-341P pan-and-tilt cameras with zoom lenses mounted on quick-set lightweight tripods; four Electrovoice microphones (two omnidirectional and two directional) mounted on floor stands, power and transmission cable, a Sony VO-2700 videocassette recorder, and a control console comprised of video switcher and audio mixer. The equipment and personnel traveled in a panel truck, which also served as control booth at one school, where it was convenient to park in a courtyard outside the classrooms and run cable through the windows. A great deal of cable is an inescapable necessity, as the geography of the site may require setting up the control console elsewhere in the building, far from the classroom. It is especially desirable to have sufficient length of cable to permit laying them along walls and otherwise keeping them out from underfoot, and to allow greater flexibility in camera location. How much is "sufficient" may only be ascertainable through a trip to the school with a tape measure. This cannot be emphasized enough; in the classroom there is no greater vexation than having too short a cable to move your camera into the optimum placement.

Possession of a video switcher/mixer permits the creation of special effects such as split screen and fades. While these effects should be used with discretion (see below), they can be useful in both informational and aesthetic ways. We used headsets for the camera operators to allow communication between them and the console operator, which was essential for setting up special effects and for keeping the console operator advised of areas of potential camera interest presently out of camera view.

Other essential equipment included: A slate (for an on-tape record in code of the teacher, the school, the date of taping, and other information); a black-and-white calibration chart, chalk, and masking tape. loose equipment was packed in cases or boxes small enough for one person to handle.

A three-person crew is sufficient for setting up and operating the equipment, although it was found that a single control console operator must concentrate to maintain the highest quality of both video and audio. Best results are achieved with a four-person crew: one operating each camera, one on the video switcher, and one on the audio mixer. At least one crew member must be familiar with the wiring up of the system, and, needless to say, a dry run before going into the field is critical. It is very helpful, although not absolutely essential, for one crew member to have sufficient technical expertise to cope with breakdowns and other equipment emergencies in the field. The alternative to having such a person on the crew is occasionally having to abandon a taping session because of equipment problems--an expensive and time-consuming event.

Setting Up in the Classroom

The following section is the distillation of our videotape experience during the field study. The rationale for each step should be implicitly apparent; where it is not, it will be explained.

The videocrew should arrive as early as necessary on the day of the videotaping to set up cameras and microphones well in advance of the arrival of students. If possible, the crew and equipment should be in position and ready to tape at least twenty minutes before taping actually begins. This allows students and teacher to get used to the presence of the equipment and camera crew, and gives the crew a breather between setting up and actual taping.

Camera and microphone cables should be clustered together where possible and taped down, preferably against the walls. Care must be taken that cables do not interfere with freedom of movement of teacher, students, and camera operators.

Many cameras have a cue light that comes on when the camera is activated. These lights should be disabled, so they cannot serve as a cue to the students that a given camera is "on."

The equipment in the classroom should be dismantled and removed only after the students have left the classroom at the end of the class period to minimize disrupting classroom instruction.

Camera Placement and Adjustment

Most classrooms are too crowded to permit much flexibility in camera placement. Nevertheless, the cameras should be more or less opposite each other so that one "sees" the front of whatever the other "sees" the back of. In this way when the split screen mode is feasible, the tape may record the faces of students (facing one camera) and of the teacher (facing the other camera) in a split image. This placement will ideally put the cameras into

opposite corners of the room (see Figure 1). Where small group activity is the focus of videotaping, at least one camera should be close enough to the small group to record detail while viewing the entire group. Gauging this optimum camera distance before the arrival of students will be a matter of experience with the seating and work patterns in the particular classroom. The other camera should be able to pan the entire classroom (remembering to avoid any corner where non-permission students may be seated). Camera placement will most often prove to be a compromise between the requirements of the study and the arrangement of the classroom. Figure 2 illustrates a more typical placement, necessitated by corners already occupied by classroom equipment. Camera 1 can zoom in on the teacher while Camera 2 focuses on students, or Camera 1 is in position to pan the classroom while Camera 2 records the reading group and the teacher.

Before taping begins, the camera lenses should be set at the same intermediate focal length. Both cameras should be focused in tandem on some equally distant object, such as a black-white calibration chart. The cameras should be adjusted to produce equally bright, well-focused pictures at the switcher. On bright, sunny days in classrooms with many windows, we found that the process is facilitated by changing the camera target control from automatic to manual. This allows camera output to be varied as a function of incident light, at the particular point on which the camera is focused. Camera output may be balanced explicitly via the use of an optional piece of equipment, a waveform monitor, although, in our experience, naked eye balancing usually suffices.

Microphone Placement

Four to six microphones should be used for audio recording in the classroom. Over-miking should be avoided; this will only result in increasing background

noise levels. Microphones should be positioned on extendable mike stands at a height sufficient to guarantee that ground level noise (foot shuffling, etc.) is avoided. Directional microphones should be employed when the actor(s) of interest is(are) in a stationary position (e.g., teacher and students in a reading group). In this case, the directional mike may be focused on the activity of interest (Figure 2). Otherwise, omnidirectional mikes may be employed for maximum audio coverage of the classroom. Omnidirectional microphones may be coupled together to yield one output. Thus, the arrangement in Figure 2 provides two directional mike outputs (one for the teacher, one for the reading group), one coupled omnidirectional output (left and right side of class), and one single omnidirectional output (rear of class). Microphone outputs may be balanced at the mixer-switcher unit.

Switcher Arrangement

Typically, the two camera outputs are led to camera inputs on the back of the switcher. Most switchers have three video monitors; one for each camera and a third for special effects (split screen, etc.). The special effects monitor output is led into the videotape recorder input. In addition, a separate video monitor may be used to monitor the video recorder output.

The microphone outputs are led into a four channel microphone mixer. This allows each microphone level to be independently adjusted by the switcher operator or audio mixer operator. In addition, an equalizer may be interposed between the mixer and the auditory input to the video recorder. The equalizer may be adjusted to suppress low frequencies (noise sources like chair movement, feet shuffling, etc.). In addition, many video recorders have an automatic noise limiter. This feature can be utilized to suppress

any auditory signal above some preset intensity level. Finally, the audio output from the video recorder may be monitored via a headset or external speaker.

Most switcher units have an intercom feature that allows the camera persons and switcher operator to communicate. This requires an additional microphone-headset for the switcher operator.

Recording

At the beginning of each recording session, one of the cameras should be focused on a chalkboard, with all relevant information concerning the taping session. This provides a permanent, on-tape record of all necessary identifying information pertaining to the taping session. This information should also be recorded on an identifying form which will accompany the cassette throughout the rest of its career (Appendix C).

An electronic stopwatch is of considerable value in keeping track of the passage of time, allowing the switcher to fade out a few seconds before the end of the tape and have a blank tape ready to snap into the recorder. If uninteresting behavior is occurring (i.e., exercise breaks), the recorder and stopwatch may be placed in pause mode to conserve valuable tape.

Demystifying the Videotaping Process

During the school year, after we had completed several tapes of each class, the teachers were offered an opportunity for themselves and their students to "see themselves on TV"--to view one of the tapes we had made. This served two purposes in our plans. It was a gesture of goodwill on the part of the project, designed to demonstrate to the teachers that we did not intend to steal away with our data and never be heard from again; and it was thought that it would demystify the videotaping procedure for the students to see the product. A selection of about 15 minutes was made from a tape

of each class, showing a maximum of student faces and activity, and at the teachers' convenience the equipment was set up at a central location in each school. Classes were brought in one at a time by a prearranged schedule. The showings were a great success, allowing students a small treat, and also permitting the researchers to chat informally with the teachers during the showings about various students and activities. This was another extra effort that we felt was worthwhile in terms of maintaining a good relationship between the project and the teachers.

Enhancing the Tape Library for General Research

The research purposes for which the tapes were made will govern to some extent how the videotaping is conducted. However, a high quality tape library will often find itself being put to research uses other than those originally intended. Some general observations can be made that will enhance the usefulness of any classroom videotape for most kinds of research.

Transitions are an important part of the school day. Although we were taping reading lessons only, we were careful to begin taping as students began entering the room for reading, and continue until the last one left at the end of the session. Where there is not a room-change, taping should begin before the end of the lesson preceding the session of interest and continue until the activities which follow the session of interest are well underway. In taping discrete activities, as well as in taping all day sessions, it is easier to edit out these transitions later if they are not wanted than to wish they were on the tapes for analysis.

One of the most important qualities of a good videotape crew is being constantly sensitive to the necessity of capturing the overall naturalistic texture of the classroom as well as specific student and teacher activities and interactions. In the interest of knowing what the teacher is doing at all times, he or she should almost always be on camera. The exception occurs

when the teacher is alone at some task (doing paperwork at a table or desk, for example). The camera should record the teacher at the task long enough to give a good idea of its nature, and then be free to pan the class, including the teacher in each pan, for as long as the task continues. The split screen mode should be used only when the teacher is stationary (seated and working with a small group, for example), and only when there is a "dead" corner of the screen in which the teacher's full face with upper torso may be inserted. If view of part of the class or group must be sacrificed for the split screen effect, the effect should be avoided. Tight "zooms" on teacher or students, while they are of some aesthetic interest, should also usually be avoided, as too much other information is lost (direction of gaze, for example).

The effective use of special effects such as fades, zooms, and split screens may actually be an art not possessed by every technician or researcher who sits down in front of a video switcher. However, the switcher who can constantly keep in mind that the purpose of videotaping is to gather the maximum amount of information about the classroom which will be interpretable by later viewers, and who resists the temptation to strive for aesthetic effects at the expense of comprehensibility and quantity of information should be adequate to the task. In other words, the point of view of the videotape crew is as important to the quality of the "research" it does as the technical tools and expertise it commands.

One of the hindsights we gained during videotaping was the importance of audio quality. As discussed above, one person can operate the video switcher and audio mixer, but two operators, one on each, are better able to optimize the potential of their respective technologies. Even the quietest, best-managed classrooms are full of chairs scraping, feet shuffling, coughs, pencil sharpening, and many other intrusive sounds. An alert audio

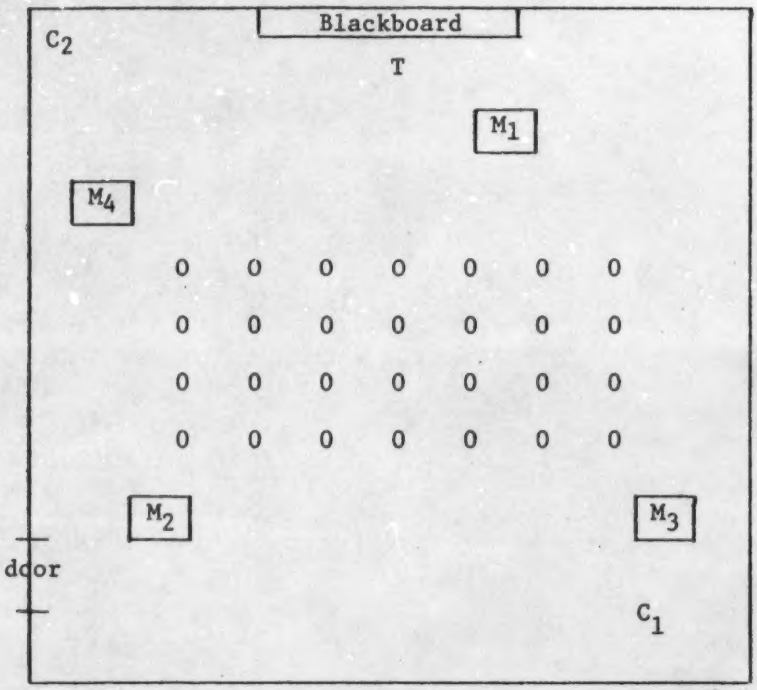
mixer operator should adjust microphone levels at the mixer as the teacher moves around the room, ensure that teacher and students are being picked up crisply during group activity (which can require slipping into the room unobtrusively to rearrange microphones after the group settles down), and, generally, maintain a balanced audio input to the recorder, which, like the video, reflects the texture of the classroom while recording specific activities so they can be understood by later viewers.

The camera operators, by maintaining a peripheral awareness of events outside the range of their lenses, should be able to alert both video switcher and audio mixer to events which merit or will soon merit recording. It should be emphasized, however, that intercom conversation should be kept at a minimum; since the camera operators are wearing headphones, they may not realize how audible their own murmering voices are to the students and teacher--and even to the recording microphones!

Although it can be argued that the intrusion of cameras and crew into the classroom greatly jeopardizes the "naturalness" of the setting, we found this not to be true. At the end of the year, the nine teachers were asked if being videotaped appeared to change behavior in their classrooms. Eight teachers said it did not; one teacher said she thought one of her students, already shy, was somewhat further inhibited by the cameras. (This student was overheard asking the teacher, "what channel are we on?", expecting, apparently, to be featured on the six o'clock news.) Ethnographers who observed the classrooms while they were being taped and while they were not recorded that they saw no differences in behavior by students or teachers when the cameras were there.

Reference

Rist, R.C. Ethnographic techniques and the study of an urban school. Urban Education, 1975, 10:i, 86-108.



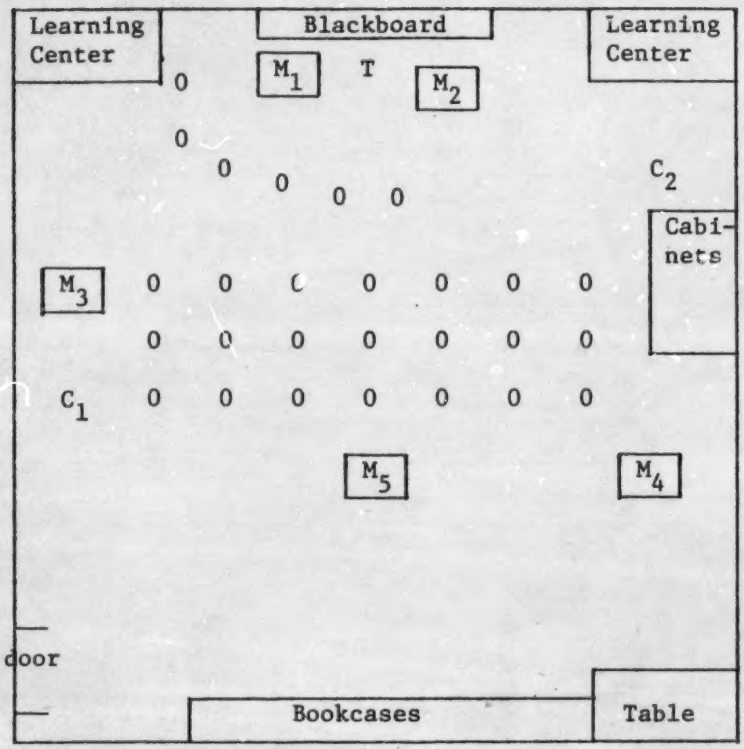
C_1 = Camera 1, C_2 = Camera 2

O = Student, T = Teacher

M_1 = Directional Microphone

M_{2-4} = Omnidirectional Microphones

Figure 1. Camera-Microphone Position



M_1 and M_2 are directional.

M_3, M_4, and M_5 are omnidirectional. M_3 and M_4 are yoked.

(Abbreviations are same as Figure 1.)

Figure 2. Camera-Microphone Position: Reading Group

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Research and Development Center
for Teacher Education
Education Annex

Consent Form for Research Study

I,_____, hereby give my consent to participate in the R&D Center research study, the general plan of which has been explained to me, including anticipated benefits, risks, and potential complications.

I fully understand that I may withdraw from this research project anytime that I wish by notifying the principal investigator.

I agree that the videotapes made as part of this research project and any copies made thereof may be used for research purposes only.

_____ _____
Date Signature of Participant

****

I hereby certify that the videotapes produced and any other data collected in this research project, as well as any copies made thereof, will be used for research purposes only. All personal identification will be removed prior to their use.

_____ _____
Date Signature of Principal Investigator

THE UNIVERSITY OF TEXAS AT AUSTIN
COLLEGE OF EDUCATION
AUSTIN, TEXAS 78712

November 17, 1978

Research and Development Center for Teacher Education
Education Annex 2.212

Dear Parents:

Our research group at The University of Texas is doing a study of the various ways reading is taught in your child's school. We are observing both the teachers and students to gain information on how learning occurs and to find ways that teaching may be improved. This research has been approved by the Superintendent of the Taylor Independent School District, by the school's Principal, and by your child's teacher.

To fully understand what we are seeing in the classroom, we need permission to get some additional information about your child. All of this information will be kept confidential, and students will be identified only by code numbers. All of the cross-references between the codes and students' names will be destroyed in May, 1979, when we have finished collecting the information, so that it will be impossible for anyone to tell from our data files which child made a particular score. The classroom observers will never see the code numbers or scores.

We need your permission to do the following:

1. Have our observer conduct an interview with your child about attitudes toward himself and toward the reading instruction. This interview will be conducted in private, during a free time, as determined by the teacher.

2. Have your child complete the "Piers-Harris Children's Self-Concept Scale (The Way I Feel About Myself)". We think how a child feels about himself may have a lot to do with how he should be taught.

3. Allow the school district to give us your child's score on a national reading achievement test, "The Metropolitan Achievement Test", administered in the spring of each year. We would like permission to use both this year's and last year's test scores.

4. Videotape some of your child's reading instruction. This will be done only when allowed by the teacher and in a way that interferes as little as possible with teaching.

These videotapes will be used for research purposes only, and will not be shown in any other context. Typically, the tapes will be used to review what happens in a classroom that might have been missed by the observer.

We are not interested in using this information to determine how a particular teacher teaches, or how a particular student learns, but only in what kind of teaching methods may work best with what kinds of students. To do this, however, we have to start with the information about individuals in order to calculate what different kinds of students or teachers are like on the average.

Please sign below if you are willing to give us permission to secure and use the above information.

I,_____, give permission to
(parent's or guardian's name)

the staff of the Evaluation of Teaching Program at the Research and Development Center for Teacher Education at The University of Texas

to interview my child, _____, give him or her the
(child's name)

Piers-Harris Self-Concept Scale, allow the Round Rock Independent School District to release my child's CTBS test scores, and allow my child to be videotaped.

_____
(date)

This form should be signed and returned to the homeroom teacher tomorrow.

Project FORCE (1978-79) EOT Program: R&D Center for Teacher Education

Tape _____of_____ Grade_____ Date_____

Teacher_____ Subject_____ Day_____

School_____ Producer_____ Time_____

District_____ Crew_____ Length of tape_____

1. Teacher notified in advance of videotaping. Yes_____ No_____
2. Teacher notified of students not participating in study. Yes_____ No_____
3. General comments:

Map_____

Label the following in the map by the code #.

#1-8 microphone #s I, II Cameras

9 observers present

10 location of excluded students

11 reading group locations

Use in Other Studies:_____

Checked out by:_____ Date:_____